

## ABSTRACT

A device for monitoring leukocyte migration is provided. The invention also provides a method of using the device to monitor leukocyte migration in the presence of physiological shear flow and therefore simulate physiological conditions of a blood vessel *in vivo*. The invention further provides a method of using the device to high-throughput screen a plurality of test agents. The present invention further provides a flexible assay system and numerous assays that can be used to test biological interactions and systems. Laminar flow gradients are employed that mimic gradient situations present *in vivo*.